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ART. XIII.—*The Stromatoporoids of the Lilydale Limestone.*

Part II.—Syringostroma, Stromatopora, *and other Genera.*

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Introduction and Acknowledgments.

This paper contains the results of further work carried out in the Department of Geology, University of Melbourne, and in the Sedgwick Museum, Cambridge, on material from Mitchell's Quarry, Cave Hill, Lilydale, derived mainly from the collection of the National Museum, Melbourne, and is a sequel to a previous paper (Ripper, 1933) which dealt with the genera *Actinostroma* and *Clathrodictyon*.

I wish to thank the Director of the National Museum, Melbourne (Mr. D. J. Mahony), for allowing me the continued use of slides and specimens in the collections of that museum; I am indebted to the Keeper of the Department of Geology, British Museum of Natural History (Dr. W. D. Lang) for permission to examine the Nicholson Collection of stromatoporoids, and to Dr. H. Dighton Thomas, of that museum, for much helpful discussion.

Description of Species.

Fam. STROMATOPORIDAE Nicholson.

1886. *Stromatoporidae*, Nicholson Mon. Brit. Strom., Gen. Introd., p. 90.

Coenosteum of variable form, often with basal epitheca; built up of radial pillars and horizontal laminae which may be more or less extensively combined to form a reticulate skeletal mesh. Skeletal fibre thick, minutely porous or tubulated; coenosteum not traversed by tabulate axial canals.

Genera: *Syringostroma* Nicholson.
Stromatopora Goldfuss.
Stromatoporella Nicholson.
Parallelopora Nicholson.
Hermatostroma Nicholson.

Syringostroma Nicholson.

1875. *Syringostroma*, Nicholson, Rept. Geol. Surv. Ohio, ii. (2), p. 251.

Stromatoporoids in which the coenosteum is built up of distinct, stout, radial pillars, often of great length and constancy of direction, and thinner horizontal laminae; skeletal fibre minutely porous, being composed of extremely fine strands, arranged in a mesh which varies with the species.

Genotype: *S. densa* Nicholson, Rept. Geol. Surv. Ohio, vol. II., pt. ii., p. 251; pl. 24, figs. 2, 2A, 2B, 1875. *S. densum* Nicholson, Ann. Mag. Nat. Hist., ser. 6, vii., p. 326, pl. X, figs. 8, 9, 1891. Corniferous Limestone, Ohio. Selected by Nicholson, Mon. Brit. Strom., Gen. Introd., pp. 97, 98, 1886.

Bassler (1915, p. 1254) states that *S. columnare* Nicholson is the genotype of this genus, but in view of the selection in clear terms of *S. densum* by Nicholson in his diagnosis of the genus, Bassler's selection must be regarded as invalid.

This genus combines the features of *Stromatopora* and *Actinostroma*, and its species form a complete series, first recognized by Parks, passing by a thickening of the horizontal laminae from forms in which the horizontal and vertical skeletal elements are well differentiated to those in which the skeletal mesh is reticulate, and finally, by imperceptible degrees, into certain allied forms of *Stromatopora* in which the horizontal and vertical elements are equally developed (Parks, 1909).

SYRINGOSTROMA aff. NIAGARENSE Parks.

(Text-fig. 1.)

1908. *Syringostroma niagarense* Parks, Univ. Toronto Studies, Geol. Series, 5, p. 52, pl. 10, figs. 1, 2, 5, 7.

Coenosteum apparently massive, occurring only as fragments; composed of stout flexuous radial pillars, 4–5 in 1 mm., and fine horizontal laminae, usually 9–10 in 1 mm., but varying slightly in the degree of crowding.

Vertical sections of this form are easily recognizable on account of the marked difference in thickness between the horizontal and vertical skeletal elements, and are further characterized by the thick, regular radial pillars, which traverse many laminae and only disappear when slight undulations cause them to leave the plane of the section. The pillars are usually 0.2 mm. in diameter and appear to expand somewhat when crossing the laminae. The latter are extremely thin and straight, so that vertical sections show a very regular structure. Owing to the state of preservation of all specimens examined from Lilydale, the finer structure within the skeletal elements cannot be clearly seen, though a spongy texture can at times be observed.

In tangential sections the radial pillars form large round cross-sections, which in interlaminar spaces are isolated or rarely connected by narrow processes. When the section crosses a horizontal lamina, however, the pillars are seen to be connected by broad processes, so that a vermiculate network, with small pores 0.2 mm. or more apart, is the result. Astrorhizal systems, consisting usually of six horizontal canals, are abundant and conspicuous, their centres being 3–4 mm. apart, so that the branching horizontal canals of adjoining systems almost come in contact. The astrorhizal systems are apparently superimposed, since in some vertical sections the horizontal canals of two or three successive systems, which are separated by a variable number of laminae, turn abruptly upward. There is, however, no definite axial canal in such superimposed systems, and the course of the horizontal laminae is not appreciably disturbed, so that the outer surface of the coenosteum was probably smooth.

This form, while being very closely related to it, differs in several particulars from *S. niagarense* Parks. The skeletal mesh is somewhat finer, as in Parks' species there are only 3–4 radial pillars, and 7–10 horizontal laminae in 1 mm., and the latter, moreover, are crowded at irregular intervals, giving the appearance of latilaminae. The astrorhizae in *S. niagarense* are never superimposed. In addition the radial pillars in the Lilydale form are more intimately connected at the levels of the horizontal laminae, forming a vermiculate mesh similar to that of *Stromatopora,* so that this form shows an advance on the structure seen in *Syringostroma niagarense.* It may be considered as an early transient in the series leading, by the progressive fusion of the horizontal and vertical skeletal elements, to such a form as *Stromatopora foveolata* (Girty), appearing in the Helderbergian of North America (Parks, 1909, p. 9), since the radial pillars and horizontal laminae are still clearly distinguishable as separate skeletal elements.

Horizon.—Yeringian.

Locality.—Mitchell's Quarry, Cave Hill, Lilydale, Victoria.

Figured Specimen.—Coll. National Museum, Melbourne, Reg. No. 13784 (Pres. S. R. Mitchell, Esq., 3.12.23).

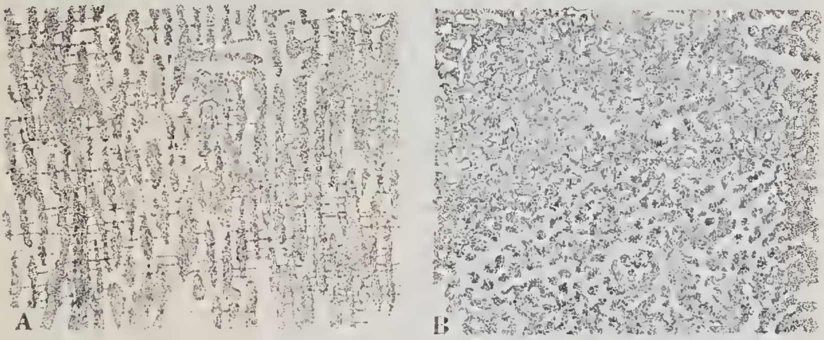

Fig. 1A. *Syringostroma* aff. *niagarense* Parks. Mitchell's Quarry, Cave Hill, Lilydale. Vertical section. Coll. National Museum, Melbourne, Reg. No. 13784. × 9 approx. Yeringian.

Fig. 1B. Same form. Tangential section of the same specimen. × 9 approx.

SYRINGOSTROMA aff. RISTIGOUCHENSE (Spencer).

(Pl. VIII., figs. 1, 2.)

1884. *Coenostroma ristigouchense*, Nicholson, Bull. Univ. Missouri, p. 49, pl. VI., figs. 12, 12A.
1886. *Syringostroma ristigouchense*, Nicholson, Mon. Brit. Strom., p. 97, pl. XI., figs. 11, 12.
1891. *Syringostroma ristigouchense*, Nicholson, Ann. Mag. Nat. Hist., ser. 6, vol. vii., p. 324, pl. VIII., figs. 6-8.
1909. *Syringostroma ristigouchense*, Parks, Univ. Toronto Studies, Geol. Ser., 6, p. 10, pl. 16, figs. 3-5.

Coenosteum massive, non-latilaminar, built up of well-defined radial pillars and straight thin horizontal laminae; pillars 3–4 in 1 mm., laminae 5–6 in 1 mm. Astrorhizae moderately abundant. Skeletal fibre porous.

The specimens of this form are all fragmentary, so that the form and external characters of the coenosteum cannot be observed. Vertical sections show a regular skeletal mesh made up of the sharply differentiated radial pillars and concentric laminae. The pillars are stout, reaching a diameter of 0.2 mm., straight, and pass through a considerable number of the fine laminae. These are regularly arranged, though sometimes falling into groups of two or three, but the periodic crowding characteristic of some species of *Syringostroma* rarely occurs. The pillars are usually slightly thickened at their intersections with the laminae.

In tangential sections the cut ends of the pillars appear as large rounded cross-sections which are usually isolated, or connected to form vermiculate rows in the interlaminar spaces. Where the plane of the section coincides with that of a lamina the pillars lose their identity and form a porous plate with regularly spaced perforations, separated by distances corresponding to the diameters of the pillars. Irregularities in the mesh are frequently caused by the large and abundant astrorhizal systems, each consisting of about six radiating, branched horizontal canals. These may reach a length of 2 mm., and the systems are separated by distances (from centre to centre) varying between 3 and 5 mm. The horizontal astrorhizal canals are also discernible in vertical sections, where they appear as rounded cross-sections rather larger than the interspaces of the normal skeletal mesh.

This form is undoubtedly most closely related to *S. ristigouchense* (Spencer), but differs in some respects from that Helderbergian species. The pillars are not so thick, and are apparently isolated, while in *S. ristigouchense* they are connected by whorls of radiating fibres, which produce a characteristic mesh in tangential sections. The apparent absence of these fibres in the Victorian specimens may, however, be due to imperfect preservation. The horizontal laminae are thinner than in *S. ristigouchense* and are not so uniformly arranged in groups of two or three. These features show that the skeletal mesh of the Victorian form has not reached the degree of reticulation seen in *S. ristigouchense*. It is therefore best considered to be a transient between *S. niagarense* Parks, which is typical of those forms in which the two skeletal elements are still distinct, and *S. ristigouchense*, in which the skeletal mesh is becoming similar to that of certain species of *Stromatopora*, e.g., *S. typica* von Rosen.

Horizon.—Yeringian.

Locality.—Mitchell's Quarry, Cave Hill, Lilydale.

Figured specimen.—Coll. Dept. of Geology, Univ. of Melbourne, Reg. No. 1619 (piece cut from specimen in the collection of F. S. Colliver, Esq.).

SYRINGOSTROMA DENSUM Nicholson.

(Pl. VIII., figs. 3-5.)

1875. *Syringostroma densa*, Nicholson, Rept. Geol. Surv. Ohio, ii., p. 2, p. 251, pl. 24, figs. 2, 2A, 2B.

1886. *Syringostroma densum*, Nicholson, Mon. Brit. Strom., Gen. Introd., p. 97, pl. XI., figs. 13, 14.

1891. *Syringostroma densum*, Nicholson, Ann. Mag. Nat. Hist., ser. 6, vii, p. 326, pl. X., figs. 8, 9.

Coenosteum hemispherical, latilaminar; skeletal mesh dense, built up of short, slender, irregularly developed radial pillars and indefinite horizontal laminae; pillars 4–5 in 1 mm., laminae 3–4 in 1 mm., or at irregular intervals. Skeletal fibre porous astrorhizae large, abundant.

The coenosteum of the only specimen examined is hemispherical, with well-defined latilaminae, between which splitting may occur. They are between 2 and 5 mm. in thickness. Vertical sections show an irregular reticulate skeletal mesh, in which the slender radial pillars, usually less than 0.1 mm. in diameter, are conspicuous. These are short and slightly undulating, and traverse quite short distances, often less than 1 mm. Usually at irregular intervals, but sometimes as often as 3 or 4 times in 1 mm. the pillars are united by lateral processes of similar breadth, which may coalesce to form a fairly well defined lamina. The pillars are usually cut short at their intersection with the planes of these laminae, which thus mark minor interruptions of growth within the latilaminae. These planes also determine the positions of the astrorhizal systems, the horizontal canals being seen in vertical sections as rounded cross-sections 0.2–0.3 mm. in diameter, and thus being much larger than the interspaces of the normal skeletal mesh. The canals are less frequently present on the planes of those laminae where no interruption in the formation of the pillars has taken place. The horizontal canals are frequently connected by other canals directed vertically or obliquely upwards, but the systems at various levels do not appear to be superimposed or connected in any regular manner.

In tangential sections the skeletal mesh is dominated by the cut ends of the radial pillars, which appear in the interlaminar spaces as isolated cross-sections. On the planes of the laminae they are connected by lateral processes of equal breadth, forming a fine, vermiculate network in which the porous character of the skeletal fibre is clearly shown. The astrorhizal systems are large and conspicuous, consisting of six or seven broad, much branched, radiating canals, which reach a diameter of 0.3 mm. near the centre of the system.

This form is almost identical with the original specimen from the Corniferous Limestone (Upper Helderbergian) of Ohio in the Nicholson Collection (Brit. Mus. Nat. Hist., Reg. No. P5598), though its state of preservation is rather better, but does not show the two distinct sets of pillars of different sizes which are mentioned in Nicholson's latest description of this species (Nicholson, 1891). The larger pillars are conspicuous only in some parts of the type specimen, and are not abundant. The figures given are of rather small extent, so that the true nature of the skeletal mesh is with difficulty discernible. The mesh composed of the small pillars and the indefinite horizontal laminae, and the large astrorhizal canals are characteristic of the specimen in the Nicholson Collection, and are also shown in the figures accompanying the description (Nicholson, 1891, pl. X., figs. 8 and 9).

The skeletal mesh of *S. densum* clearly shows that the species is one of the more advanced transients in the series connecting *S. niagarense* Parks and allied forms with *Stromatopora foveolata* (Girty), *S. concentrica* Goldf., and allied forms. The radial pillars are less easily distinguishable as separate skeletal elements, and the rather indefinite laminae tend to be arranged in groups, a number of which together form the latilaminae of the coenosteum. The mesh thus produced resembles somewhat that of such a form as *Str. foveolata,* in which, however, the pillars and laminae have still less identity and are more completely merged in a reticulate network. It is possible that *Syr. densum* is not closely related to the species of the group *Syr. niagarense-Str. foveolata,* since the radial pillars are much more slender and the skeletal mesh is finer.

Horizon.—Yeringian.

Locality.—Mitchell's Quarry, Cave Hill, Lilydale.

Figured specimen.—Coll. Dept. of Geology, Univ. of Melbourne, Reg. No. 1620, collected by A. C. Frostick, Esq.

TABLE I.—CHARACTERS OF VICTORIAN SPECIES OF *Syringostroma,* AND OF SPECIES WITH WHICH THEY ARE COMPARED.

Species.	Horizon.	Locality.	Laminae mm.	Pillars mm.	Astrorhizae.	Form of Coenosteum.
Syringostroma niagarense Parks	Niagaran	N. America	4–10 thin	4–5	Abundant, branching, not superimposed	Circular, explanate, latilaminar
S. aff. *niagarense* Parks	Yeringian	Lilydale, V.	9–10 thin	4–5	Abundant, branching, superimposed	Massive, non latilaminar
S. ristigouchense (Spencer)	L. Helderbergian	Canada ..	7 in 2 mm. thick	5–6 in 2 mm.	Large, branching, superimposed	Massive, latilaminar
S. aff. *ristigouchense* (Spencer)	Yeringian	Lilydale, V.	5–6 thin, periodically crowded	3–4	Large, branching, superimposed ?	Massive, non latilaminar
S. densum Nich.	Yeringian U. Helderbergian	Lilydale, V. N. America	3–4 indefinite	4–5	Large, branching, not superimposed	Hemispherical, or laminar, latilaminar

Stromatopora Goldfuss, emend. Nicholson.

1826. *Stromatopora* Goldfuss, "Petrefacta Germaniae," Bd. 1., p. 21

1886. *Stromatopora* Nicholson, Mon. Brit. Strom., Gen Introd., p. 91.

Stromatoporoids in which the coenosteum is usually massive or laminar, sometimes latilaminar; built up of a completely reticulate skeletal mesh in which the horizontal laminae and radial pillars are typically not distinguishable as separate skeletal elements. Skeletal fibre coarsely porous; astrorhizae usually abundant.

Genotype: *S. concentrica* Goldfuss, Petref. Germ., p. 22, pl. VIII., figs. 5A-C, 1826; Nicholson, Mon. Brit. Strom., p. 164, pl. III., fig. 5, pl. XI., figs. 15-18, pl. XX., fig. 10, pl. XXI., figs. 1-3, pl. XXIV., figs. 9, 10, 1886-1891.

The species of *Stromatopora* fall into two more or less distinct groups. In the first (group of *S. concentrica*), containing many Silurian and Helderbergian species, the coenosteum is usually latilaminar, and in vertical sections horizontal laminae are clearly distinguishable, while the radial pillars are poorly developed. Such a group includes *S. foveolata* (Girty), *S. typica* von Rosen, *S. constellata* Hall, and *S. concentrica* Goldfuss, all of which seem to show a continuation of the trend of thickening of the horizontal laminae seen in the species of *Syringostroma*. The second group (group of *S. hüpschii* (Bargatzky)) contains those forms, usually common in the Middle Devonian, in which the horizontal laminae are reduced to occasional processes joining the relatively stout, straight radial pillars, which thus dominate the skeletal mesh as seen in vertical sections. Such species are *S. beuthii* Bargatzky, *S. hüpschii* (Bargatzky), *S. bücheliensis* (Barg.), *S. gentilis* Gortani, and *S. lilydalensis*, sp. nov. Tangential sections of members of both groups, however, show the completely reticulate skeletal mesh characteristic of the genus.

STROMATOPORA FOVEOLATA (Girty).

(Text-fig 2.)

1895. *Syringostroma foveolatum*, Girty, Rep. State Mus., New York, 48, ii., p. 295, pl. VI., figs. 8, 9.

1909. *Stromatopora foveolata*, Parks, Univ. Toronto Studies, Geol. Ser. 6, p. 20, pl. 17, figs. 5-7; pl. 18, figs. 4. 10.

Coenosteum massive, external form unknown; skeletal mesh vermiculate, but with distinct horizontal laminae, 4 in 1 mm., and less conspicuous radial pillars, 4–5 in 1 mm.

The radial pillars as seen in vertical section are stout, over 0.2 mm. thick, and discontinuous, often passing through only one horizontal lamina. These are thick, being composed of 2–5 or more thin fibres which connect the radial pillars, and are crowded at irregular intervals, leaving open spaces occupied by horizontal astrorhizal canals. In tangential sections the radial pillars present much the same appearance as do those in similarly oriented sections of *Syringostroma* aff. *niagarense* Parks, but they are even more completely united on the planes of the laminae to form a vermiculate network with very small pores, rather more than 0.2 mm. apart. In the better preserved parts of tangential sections the minutely fibrous structure of the vertical pillars can be observed; in general, however, this is not as well shown as in the examples of the species described by Parks (1909) from the Lower Helderbergian (*Pentamerus* limestone) of New York.

Astrorhizae are moderately abundant, and grouped into vertical systems with an axial canal, which passes through about four horizontal laminae. The axial canal is sometimes tabulate and is wall-less, being bounded by the radial pillars and the upturned edges of the laminae, and joined at intervals of one or two laminae by the horizontal canals, which turn abruptly upwards. The laminae are only very slightly curved, so that prominent monticules may not have been present on the upper surface.

This form is somewhat coarser in skeletal structure than the Lower Helderbergian examples described by Girty and Parkes, but there is little doubt that it should be referred to this species. Another example from Lilydale (Coll. Nat. Mus., Melbourne, Reg. No. 13764) is somewhat finer and, both in vertical and tangential sections, shows a less complete fusion of the vertical and horizontal skeletal elements, so that, while being included under this species, it should probably be regarded as an earlier transient in the series *Syringostroma-Stromatopora*. It is thus clear that in the Lilydale fauna later transients (*Str. foveolata*) occur along with surviving earlier transients (*Syr.* aff. *niagarense* and *S.* aff. *ristigouchense*) which are but little removed from the primitive end-member of the series (*Syr. niagarense*) characterizing Niagaran (= Wenlock) beds in North America.

Horizon.—Yeringian.

Locality.—Mitchell's Quarry, Cave Hill, Lilydale.

Figured specimen.—Coll. Dept. of Geology, Univ. of Melbourne, Reg. No. 768.

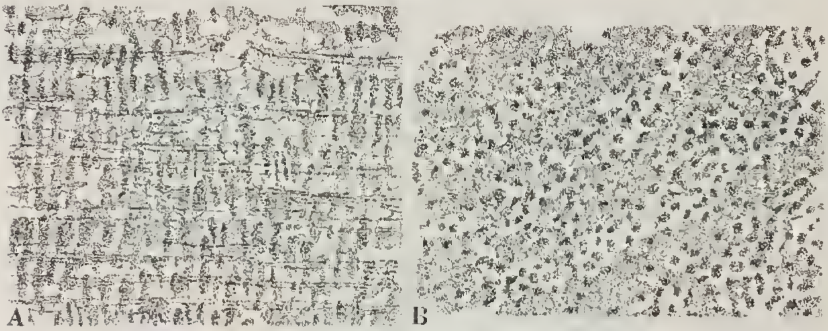

Fig. 2A. *Stromatopora foveolata* (Girty). Mitchell's Quarry, Cave Hill, Lilydale. Vertical section. Coll. Depart. of Geology, University of Melbourne, Reg. No. 768. × 9 approx. Yeringian.

Fig. 2B. Same species. Tangential section of the same specimen. × 9 approx.

STROMATOPORA aff. HÜPSCHII (Bargatzky).

(Pl VIII., figs. 7, 8.)

1881. *Caunopora hüpschii* Bargatzky, "Die Stromatoporen des rheinischen Devons," p. 62.

1886 *Stromatopora hüpschii* Nicholson, Mon. Brit. Strom., Gen. Introd., p. 50, figs. 6A, 6B.

1891. *Stromatopora hüpschii* Nicholson, Mon. Brit. Strom., p. 176, pl. X., figs. 8, 9; pl. XXII., figs. 3-7

1919. *Stromatopora hüpschii*, Vinassa de Regny, Palaeontologia italica, xxiv., p. 113, pl. XII. (VII.), figs. 5, 6.

(For further synonymy see Nicholson, 1891.)

Coenosteum probably massive, composed of well defined, stout radial pillars (3–4 in 2 mm.) connected occasionally by horizontal processes of varying thickness.

Vertical sections show a rather coarse, open, but very regular skeletal mesh, which is dominated by the thick, straight radial pillars. These are connected both by fairly infrequent horizontal processes of a similar thickness, joining usually but two or three pillars, and by more abundant, extremely thin "tabulae," which may connect several successive pillars. These processes, however, never coalesce to form definite horizontal laminae. The skeletal fibre is very thick, having a diameter of 0.2–0.3 mm., but does not form a compact mesh, since the radial pillars are separated by distances greater than their diameters.

In tangential sections the radial pillars with their occasional connecting processes form an extremely regular, open, vermiculate mesh, in which the porous nature of the skeletal fibre is clearly seen. Astrorhizae are not present.

This stromatoporoid, while obviously very closely related to *Str. hüpschii* (Barg.), differs from that form in some respects, so that, in the absence of further material, one specimen only being at present available, it is inadvisable either to identify it definitely with the European form or to separate it as a new species. The skeletal mesh in *S. hüpschii* is rather more compact, since the radial pillars are separated by distances less than their diameter, and tangential sections are further distinguished by the abundant small astrorhizae.

Horizon.—Yeringian.

Locality.—Mitchell's Quarry, Cave Hill, Lilydale.

Figured specimen.—Coll. National Museum, Melbourne, Reg. No. 13790 (Pres. J. S. Green, Esq., 7.8.11).

STROMATOPORA BÜCHELIENSIS (Bargatzky).

(Pl. VIII., figs. 9, 10.)

1881. *Caunopora bücheliensis* Bargatzky, "Die Stromatoporen des rheinischen Devons," p. 62.

1886-1891. *Stromatopora bücheliensis* Nicholson, Mon. Brit. Strom., pp. 23, 186, pl. X., figs. 5-7, pl. XXIII., figs. 6, 7.

1912. *Stromatopora bücheliensis* Gortani, Rivista italiana di palaeontologia, xviii., p. 125, pl. IV., figs. 12, 13.

1919. *Stromatopora bücheliensis* Vinassa de Regny, Palaeontographia italica, xxiv., p. 116.

1934. *Stromatopora bücheliensis* Le Maitre, Mém. Soc. Géol. du Nord, xii., p. 194, pl. XIV., figs. 4, 5.

Coenosteum massive, built up of undulating "laminae," which, however, are not distinguishable in thin sections as definite interruptions in the deposition of the skeletal fibre. Skeletal fibre porous; skeletal mesh reticulate; vertical pillars conspicuous, 5 or 6 in 2 mm.

These specimens are massive in habit and are built up of irregular latilaminae about 5 mm. thick. In vertical sections the radial pillars are distinguishable as separate skeletal elements, but the laminae are rudimentary. The skeletal mesh is considerably distorted as a result of the extreme abundance of large "Caunopora" tubes. The skeletal fibre is rather thick (between 0.2 and 0.3 mm.) and the mesh is compact, since the interspaces have a similar or rather smaller diameter. These latter may sometimes be occupied by tabulae. Tangential sections show a compact, vermiculate skeletal mesh, which is sometimes interrupted by the poorly developed astrorhizae, consisting of small branching horizontal canals. They are usually not grouped into distinct systems, but occasionally small, remote groups of radiating canals, the whole group being but 2 or 3 mm. in diameter, may occur at intervals of about 10 mm.

Most specimens have abundant, large and very regularly distributed "Caunopora" tubes. These are thick-walled, about 0.5 mm. in diameter, and are usually filled with secondary calcite. They are occasionally tabulate, the tabulae being slightly convex towards the surface of the coenosteum. When branching of the "Caunopora" tube occurs, the new tube runs horizontally for a short distance before traversing the coenosteum vertically. Horizontal connecting processes also occur between two adjacent tubes, but these still have definite walls and are thus distinct from the skeletal mesh of the coenosteum.

In the distortion of the skeletal mesh, which obscures their true relationships, and the type of "Caunopora" tubes these examples resemble some placed by Nicholson in this species, and come particularly close to one example in the Nicholson Collection (Brit. Mus. Nat. Hist., Reg. No. P5913) from Gerolstein, Eifel District, Germany, in which, however, the skeletal mesh is a little finer than in the Victorian form.

Horizon.—Yeringian.

Locality.—Mitchell's Quarry, Cave Hill, Lilydale.

Figured specimen.—Coll. National Museum, Melbourne, Reg. No. 13763.

STROMATOPORA BÜCHELIENSIS var. DIGITATA Nicholson.

(Pl. VIII., fig. 6, Text-fig. 3.)

1891. *Stromatopora büchelicnsis* var. *digitata*, Nicholson, Mon. Brit. Strom., p. 187, pl. XXIII., figs. 4, 5.

In addition to the typical form, there is present in the Lilydale limestone a rarely occurring variety which is distinguished on account of its mode of growth. The coenosteum is made up of a number of cylinders which are composed of concentric laminae. The skeletal mesh is reticulate, and of the same type as that of *S. büchelicnsis*, but the horizontal laminae and radial pillars are more conspicuous and distinct, each numbering about 6 in 2 mm. Astrorhizae are apparently not present.

"Caunopora" tubes are abundant, and of a peculiar type. They are regularly arranged in systems radiating from the axes of the cylinders, and are thus divergent and branch frequently, usually giving off horizontal lateral tubes which turn abruptly and traverse the cylinder in a direction normal to its surface. The tubes are thick-walled and possess funnel-shaped tabulae, which sometimes form vesicular tissue near the periphery. In tangential sections the "Caunopora" tubes resemble transverse sections of *Syringopora,* though they are of much smaller size, reaching a diameter of only 0.5 mm.

This variety resembles somewhat *S. concentrica* var. *colliculata* Nich. in the occurrence of definite horizontal laminae within the reticulate skeletal mesh. It is easily distinguished from that form by the apparent lack of astrorhizae, which, in superimposed systems, are characteristic of Nicholson's variety, and by the less regular skeletal mesh, in which the laminae are not so highly developed.

Horizon.—Yeringian.

Locality.—Mitchell's Quarry, Cave Hill, Lilydale.

Figured specimen.—Coll. National Museum, Melbourne, Reg. No. 13794 (Pres. R. H. Annear, Esq., 12.3.14).

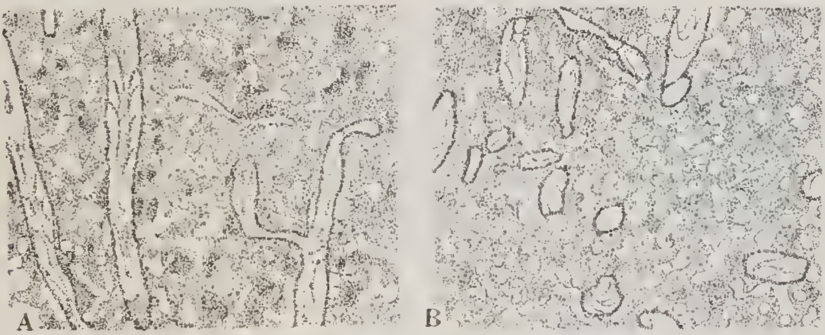

Fig. 3A. *Stromatopora bücheliensis* var. *digitata* Nicholson. Mitchell's Quarry, Cave Hill, Lilydale. Vertical section. Coll. National Museum, Melbourne, Reg. No. 13794. × 9 approx. Yeringian.
Fig. 3B. Same species. Tangential section of the same specimen. × 9 approx.

STROMATOPORA LILYDALENSIS, sp. nov.

(Pl. IX., figs. 1, 2.)

Form of complete coenosteum unknown, but apparently massive or digitate; built up of latilaminae about 1 cm. in thickness; surface of coenosteum probably smooth. Radial pillars conspicuous, divergent, 6 in 2 mm.; horizontal laminae not distinguishable.

In vertical sections the skeletal mesh is completely dominated by the vertical element, which forms a network of anastomosing pillars. These appear to branch, and diverge fairly regularly from vertical planes about 3 mm. apart. This structure, however, is not sufficiently pronounced to destroy the massive appearance of the coenosteum as a whole. The skeletal fibre is usually 0.2–0.3 mm. thick, but may become stouter towards the upper limits of the latilaminae, and is finely porous. The spaces between the pillars are of approximately the same diameter as the pillars, and are traversed at irregular intervals by thin fibres. As shown by Parks (1909, p. 47) these spaces are not zooidal tubes, under which name they were described by Nicholson, but the so-called tabulae represent the very much reduced horizontal skeletal element.

Tangential sections show a vermiculate skeletal mesh in which the radial pillars are indistinguishable from the connecting processes. This mesh is unusually regular, since neither astrorhizal canals nor " Caunopora " tubes are present.

Some examples in which the mesh is slightly coarser appear to be transitional between this species and *S. concentrica* Goldf. since the pillars become less divergent and the laminae more definite, and the whole coenosteum assumes a latilaminar aspect. (Coll. National Museum, Melbourne, Reg. No. 13782.)

This abundant species is most closely related to *S. bücheliensis* (Barg.), which is characteristic of the Middle Devonian of Europe. In this form the radial pillars, while being similarly spaced, usually have not the divergent arrangement which is so characteristic of the Lilydale species. One specimen (Brit. Mus. Nat. His., Reg. No. P5911) from the Middle Devonian of Büchel, referred to this species by Nicholson, has divergent pillars, but has also a much finer skeletal mesh, so that it is distinct from the typical form, and should probably be separated from it. The skeletal fibre of *S. bücheliensis* is somewhat finer, and the presence of astrorhizae in the European form still further distinguishes it from *S. lilydalensis.*

Horizon.—Yeringian.

Locality.—Mitchell's Quarry, Cave Hill, Lilydale.

Figured syntypes.—Coll. National Museum, Melbourne, Reg. Nos. 13768 (Pres. F. Chapman, Esq., 7.6.02), and 13785 (Pres. S. R. Mitchell, Esq., 3.12.23).

Stromatoporella Nicholson.

1886. *Stromatoporella* Nicholson, Mon. Brit. Strom., p. 92.

1886. *Stromatoporella* Nicholson, Ann. Mag. Nat. Hist., ser. 5, xvii., footnote, p. 234.

1914. *Stromatoporella* Heinrich, Centralblatt f. Min., etc., xv., p. 735; 1916, Journ Geol. xxiv., p. 60.

1936. *Stromatoporella* Parks, Univ. Toronto Studies, Geol. Ser. 39, p. 90.

Stromatoporoids in which the coenosteum is usually laminar, with a basal epitheca; composed of radial pillars and horizontal laminae which are distinguishable as separate skeletal elements; radial pillars short, generally traversing one interspace only; skeletal interspaces usually tabulate; astrorhizae abundant, well-developed and often superimposed. Skeletal fibre thick, porous.

Genotype: *Stromatopora granulata* Nicholson, Ann. Mag. Nat. Hist., ser. 4, xii., p. 94, pl. IV., figs. 3, 3A, 1873; *Stromatoporella granulata*, Nicholson, Mon. Brit. Strom., p. 202, pl. XXVI., figs. 1, 1A, 1B, 1891. Hamilton Group, Ontario.

STROMATOPORELLA GRANULATA Nicholson.

(Pl. IX., figs. 3-5.)

1873. *Stromatopora granulata* Nicholson, Ann. Mag. Nat. Hist., ser. 4, xii., p 94, pl. IV., figs. 3, 3A.

1886. *Stromatoporella granulata* Nicholson, *Ibid.*, ser. 5, xviii., p. 10.

1886-1892. *Stromatoporella granulata* Nicholson, Mon. Brit. Strom., p. 202, pl. I., figs. 4, 5, 14, 15; pl. IV., fig. 6; pl. VII., figs. 5, 6; pl. XXVI., figs. 1, 1A, 1B.

1936. *Stromatoporella granulata* Parks, Univ. Toronto Studies, Geol. Ser., 39, p. 95, pl. XV., figs. 6, 7; pl. XVI., figs. 1-7.

Coenosteum massive, of small size, built up of latilaminae 2–3 mm. broad; horizontal laminae well defined, undulating, 4–6 in 1 mm., connected by stout, complete, often hollow radial pillars, 3–4 in 1 mm.; astrorhizal mamelons present.

In vertical section the skeletal mesh presents a strong resemblance to that of a *Clathrodictyon* of the type of *Cl. regulare* (von Rosen), or of *Cl. calamosum* Ripper, in which the radial pillars are obviously formed by the downward inflection of the rather thick laminae. The porous skeletal fibre and the greater thickness of the laminae, however, show that the form is in reality a *Stromatoporella*. The laminae are grouped into latilaminae, at the upper and lower boundaries of which the skeletal mesh becomes irregular and considerably finer, showing that interruptions in the growth of the coenosteum have taken place. The horizontal laminae are strongly arched between the radial pillars, and are often broken, so that these upwardly inflected parts of the laminae sometimes appear to replace the pillars. Astrorhizae are abundant, and appear in vertical section as well defined horizontal non-tabulate canals of rather greater diameter than the interlaminar spaces. Near the astrorhizal mamelons these turn vertically upward, but no axial canals have been observed.

The tangential section is characterized by the isolated radial pillars, which often appear as rings in cross-section, and by the cut edges of the laminae, which have a concentric arrangement about the astrorhizal mamelons. The astrorhizae, owing probably to the inclined courses of the canals, are not very conspicuous in tangential section.

The Victorian example is in almost every way identical with the form described by Nicholson (1891-2) from the Hamilton Group of Ontario. The upward inflection of the laminae to form perforated tubercles is much more pronounced in the Victorian specimen, the astrorhizae are probably less highly organized, and the interlaminar septa, which are moderately common in the Canadian form, are lacking. In the absence of further material, and in view of the great variations exhibited even within individual coenostea, it is probably inadvisable to describe this form as a new variety, and it is therefore included in the species as defined by Nicholson.

Horizon.—Yeringian.

Locality.—Mitchell's Quarry, Cave Hill, Lilydale.

Figured specimen.—Coll. Dept. of Geology, Univ. of Melbourne, Reg. No. 1622.

STROMATOPORELLA cf. DAMNIONENSIS Nicholson.

(Pl. IX., figs. 7, 8.)

1892. *Stromatoporella damnionensis* Nicholson, Mon. Brit. Strom., p. 207, pl. XXVII., figs. 8, 9.

Coenosteum massive, latilaminar, built up of conspicuous undulating horizontal laminae, of which 4 or 5, with the interlaminar spaces, occupy 1 mm., and irregularly spaced radial pillars; astrorhizal mamelons present.

Vertical sections show the regular horizontal laminae, reaching a thickness of 0.2 mm., which are thrown into undulations at intervals, forming the astrorhizal mamelons. The radial pillars are stout, traverse usually but one interlaminar space, and often appear to be formed by the downward inflection of the horizontal laminae. Interlaminar septa are rarely present. Irregularly distributed horizontal and vertical canals of approximately the same diameter as the interlaminar spaces probably belong to the astrorhizal systems.

In tangential section the skeletal mesh has the appearance characteristic of *Stromatoporella.* The radial pillars are isolated where the section passes through an interlaminar space, and are united in a vermiculate mesh or a solid plate to form the laminae. The cut edges of the upturned laminae in the vicinity of the astrorhizal mamelons are very conspicuous, though the canals are rarely discernible, and the centres of the mamelons are usually replaced by coarsely crystalline calcite.

This specimen corresponds well with *Str. damnionensis* Nich. of the Devonian limestones of South Devon, and resembles most closely the specimen from Teignmouth (Brit. Mus. Nat. Hist., Reg. No. P6042), which is that figured by Nicholson on Pl. XXVII. (Figs. 8 and 9) of the Monograph of British

Stromatoporoids, and which must be regarded as the holotype. The laminae are rather thinner and more crowded than in the British specimen, but the type of skeletal mesh, the arrangement of the astrorhizae, and the form of the coenosteum are similar in both examples. The Victorian form resembles less closely the examples of the species from Gerolstein and Sötenich in the Nicholson Collection, since these have a much coarser skeletal mesh and thicker laminae.

The species is readily distinguished from *S. granulata* Nich. by the straighter laminae and the solid radial pillars. Tangential sections of the two species are thus distinct, as the hollow radial pillars in *S. granulata* appear as circles, which are lacking in the corresponding sections of *S. damnionensis.* The group of *S. prima* Parkes (1933) may contain related forms, but their affinities have not been discussed, and no definite statements can therefore be made without an examination of specimens.

Horizon.—Yeringian.

Locality.—Mitchell's Quarry, Cave Hill, Lilydale.

Figured specimen.—Coll. National Museum, Melbourne, Reg. No. 13788 (Pres. W. J. Parr, Esq., 7.11.13).

TABLE II.—CHARACTERS OF VICTORIAN SPECIES OF *Stromatoporella.*

Species.	Horizon.	Locality.	Laminae mm.	Pillars mm.	Astrorhizae.	Form of Coenosteum.
Stromatoporella granulata Nich.	Hamilton Yeringian	N. America Lilydale, V.	4–6	3–4, formed by inflection of laminae	Superimposed, situated on mamelons	Laminar or massive
S. cf. *damnionensis* Nich.	Yeringian	Lilydale, V.	4–5	Irregularly spaced, formed by inflection of laminae	Superimposed, situated on mamelons	Laminar or massive
S. damnionensis Nich.	M. Devonian	Europe ..	6	Irregularly spaced	Superimposed, situated on mamelons	Massive

Fam. IDIOSTROMATIDAE Nicholson.

1886. *Idiostromatidae* Nicholson, Mon. Brit. Strom., Gen. Introd., p. 98.

Stromatoporoids in which the coenosteum is typically cylindrical, being then simple, branched or fasciculate; also massive or spheroidal. Coenosteum composed of porous, tabulated or apparently compact skeletal fibre; skeletal mesh vermiculate, but with definite radial pillars or concentric laminae; tabulate axial tube present in cylindrical forms; tubes otherwise distributed irregularly through coenosteum. Astrorhizae absent.

Genera: *Idiostroma* Winchell.
Stachyodes Bargatzky.
Amphiphora Schulz.

In his first definition of the family Idiostromatidae Nicholson included the genus *Hermatostroma*, which he subsequently (Mon. Brit. Strom., p. 215) removed to the Stromatoporidae.

Idiostroma Winchell.

1867. *Idiostroma* Winchell, Proc. Amer. Ass. Adv. Sci., p. 99.

1886. *Idiostroma* Nicholson, Mon. Brit. Strom., Gen. Introd., p. 99.

Stromatoporoids in which the coenosteum is typically cylindrical, sometimes fasciculate, sometimes massive or submassive. Radial pillars and concentric laminae distinct; skeletal fibre porous. Cylindrical forms may have tabulate axial canal. Astrorhizae absent.

Genotype: *I. caespitosum* Winchell, Proc. Amer. Ass. Adv. Sci., pp. 96, 98, 99, 1867. Bassler, Bibliographic Index of American Ordovician and Silurian Fossils, Vol. I., p. 659, 1915. Devonian of North America.

The internal structure of the forms originally described by Winchell (1867) in erecting the genus is unknown, so that the relations between *I. caespitosum* Winchell and *I. gordiaceum* Winchell of the Devonian of North America and the species described by Nicholson (1886) cannot be ascertained. The genus *Idiostroma* as defined by Nicholson appears to include two forms which agree in the shape of the coenosteum, but which have distinct types of skeletal mesh. The species first described, and regarded by Nicholson as a typical form of the genus, *I. roemeri* Nich. of the Rhenish Devonian, has well defined continuous radial pillars which pass through a number of concentric laminae. *I. oculatum* Nich., of the Devonian of Great Britain and Germany, has, on the other hand, an internal structure approximating to that of a *Stromatoporella*. The concentric laminae are well developed, and connected by short, stout radial pillars, which rarely pass through more than one interlaminar space. These differences in internal structure seem to suggest that the genus *Idiostroma* includes in reality forms which are generically distinct, but which have, probably from environmental causes, assumed a similar mode of growth, so that a cylindrical coenosteum, usually with an axial canal, is produced. It may be suggested further that *I. roemeri* probably has affinities with those species of *Stromatopora* in which the radial pillars are dominant, or with *Hermatostroma*, while *I. oculatum* may be a form of *Stromatoporella*. Similar cases are not rare among recent corals, so that the possibility of such variation in another important reef-building organism should not be overlooked.

IDIOSTROMA OCULATUM Nicholson.

(Pl. IX., fig. 6, Text-fig. 4.)

1886. *Idiostroma oculatum* Nicholson, Mon. Brit. Strom., p. 101, figs. 14, 15.

1892. *Idiostroma oculatum* Nicholson, Mon. Brit. Strom., p. 225, figs. 32, 33; pl. XXIX., figs. 8-11.

Coenosteum cylindrical or massive, usually of small size; non-latilaminar; built up of straight concentric laminae and stout radial pillars, which usually pass through but one interlaminar space; laminae 4 in 1 mm., pillars less regularly distributed; astrorhizae absent; axial canal sometimes present in cylindrical coenostea.

The specimens are usually much weathered, but appear to show the external characters described by Nicholson for this species. The largest example is hemispherical and has a radius of 25 mm. The cylindrical examples, which are possibly fragments of fasciculate coenostea, are more abundant, and have diameters ranging from 10 to 20 mm.; the exposed surfaces are usually rather powdery, so that the finer structural details are not observable. The most conspicuous features of the surface are the circular apertures of the "Caunopora" tubes.

In vertical sections (transverse) the mesh characteristic of *Stromatoporella* is seen. The skeletal fibre is porous and rather coarse, and the horizontal laminae are separated by interlaminar spaces which are equal in diameter to the width of the laminae. The horizontal laminae are usually straight and of even thickness, but may thin out, particularly in regions of irregular growth, and give the appearance of tabulae crossing "zooidal tubes." "Interlaminar septa" like those described by Nicholson as being present in *Stromatoporella eifeliensis* Nich. or *S. solitaria* Nich. are present but not abundant. These irregularly vesicular partitions seem to indicate some interruption in the growth of the horizontal laminae, since these also become thinner as they approach the region where the "septa" are developed.

"Caunopora" tubes are abundant and regularly developed in all specimens available. They reach a diameter of 0.5 mm. or more, and are often filled with secondary calcite, so that the nature of the original walls is not discernible, and the tabulae are often completely obliterated. In some specimens, the "Caunopora" tubes have horizontal tabulae, but of commoner occurrence is the type which has the funnel-shaped tabulae characteristic of *Syringopora*. The "Caunopora" tubes form in the cylindrical coenostea a very regular network, and are frequently connected by horizontal stolons, which may also give rise to new tubes or corallites. In those specimens in which the mode of growth of the "Caunopora" tubes near the centre of the coenosteum can be observed, no change in the nature of their walls is seen. Nicholson has noted (Mon. Brit. Strom., p. 102) that in some specimens of *I. oculatum,* presumably from the Middle Devonian of Büchel, Germany, though this is not definitely stated, the "Caunopora" tubes have the normal thickened walls in the outer parts of the coenosteum, but lose these and communicate directly with the interlaminar spaces near the centre. He argued at first that the "Caunopora" tubes were thus clearly part of the organism in which they were found, and that they were probably connected with the reproductive processes. In his later description of *I. oculatum,* however (Mon. Brit. Strom., p. 227), he suggests that the evidence is inconclusive, since the tubes are not always present, and absorption of the walls of a foreign organism by the enclosing stromatoporoid may well take place.

Most specimens have an axial region which in its structure is distinct from the rest of the coenosteum. One example (Coll. National Museum, Melbourne, Reg. No. 13781) has an axial canal which is now filled with coarsely crystalline calcite. The skeletal mesh in its vicinity is rather irregular, and the "Caunopora" tubes, which are of the *Syringopora* type, run parallel to the axial region, as shown by the circular cross-sections in a transverse section of the coenosteum. The other examples, however, have in transverse section a fairly well defined circular or elliptical axial zone of porous skeletal fibre, which forms an irregularly vermiculate mesh. This zone is separated from the outer region of the coenosteum, in which the mesh is normal, by the first of the concentric laminae, which may be somewhat thicker than usual. A similar structure has been figured by Nicholson (Mon. Brit. Strom., pl. XXIX., Fig. 9) in an example from Shaldon, near Teignmouth, South Devon, and the occurrence of similar reticulate tissue is mentioned in the description of the species (*Ibid.*, p. 226).

Tangential sections passing through the horizontal laminae show these to be compact plates with occasional perforations. Those parts of the sections which pass through an interlaminar space show a grouping of the pores of the skeletal mesh around the "Caunopora" tubes, and the radial pillars are sometimes seen as isolated, rounded, solid cross-sections.

In the form of the coenosteum and the type of skeletal mesh these specimens are identical with the species *I. oculatum* Nich. described from European localities and figured on pp. 226-227 of Nicholson's monograph. That Figs. 8 and 9 on Plate XXIX. represent an example of the same species is not at all certain, since the skeletal mesh is of an entirely distinct type, in which the radial pillars are the dominant skeletal elements. As noted above in dealing with the genus, it is not impossible that it may contain forms which, regarded from the point of view of internal structure, and particularly of the skeletal mesh, should be considered to be generically distinct. *I. oculatum* has in this respect affinities with members of the genus *Stromatoporella,* though its mesh cannot be identified with that of any species at present known.

Horizon.—Yeringian.

Locality.—Mitchell's Quarry, Cave Hill, Lilydale.

Figured specimens.—Coll. National Museum, Melbourne, Reg. Nos. 13766 (Pres. F. Chapman, Esq., 7.6.02) and 13779 (Pres. F. Chapman, Esq., 20.12.15).

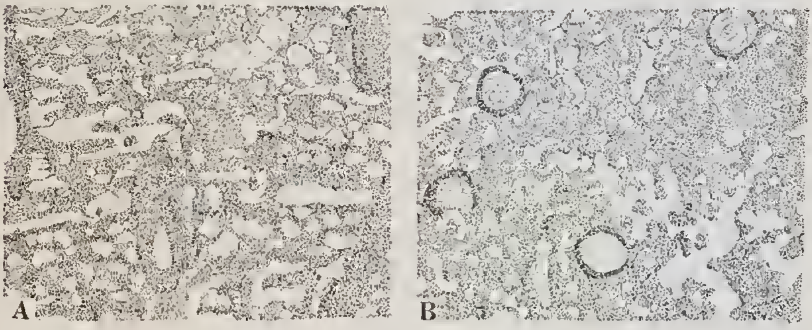

Fig. 4A. *Idiostroma oculatum* Nicholson. Mitchell's Quarry, Cave Hill, Lilydale. Vertical (transverse) section. Coll. National Museum, Melbourne, Reg. No. 13766. × 9 approx. Yeringian.

Fig. 4B. Same species. Tangential section of the same specimen. × 9 approx.

Remarks on the Stromatoporoid Assemblage of the Lilydale Limestone.

At the present stage in the work on Victorian stromatoporoids it is impossible to give a complete analysis, based on the evolutional stages reached by the various species. of the Lilydale fauna. The affinities of the fauna will therefore be treated in more detail after the description of other Victorian faunas, when conclusions and comparisons based on the evolutional changes observed in the stromatoporoids can more appropriately be drawn.

The stromatoporoid fauna of the Lilydale limestone is rich in individuals and species, and consists, so far as is known at present, of eighteen forms belonging to six genera. Of these forms six are new, while the rest are identical with, or have close affinities with, species already described from North America and Europe.

The horizons on which these forms most usually occur elsewhere are indicated below :—

Species.	Horizon.	Localities.
Actinostroma verrucosum Goldfuss	Givetian	Devon, Eifel, Paffrath
Clathrodictyon regulare (von Rosen)	Wenlock	Gt. Britain, Gotland
Syringostroma niagarense Parks	Niagaran	Michigan
S. ristigouchense (Spencer)	Helderbergian	Canada
S. densum Nich.	U. Helderbergian	Ohio
Stromatopora foveolata Girty	L. Helderbergian	New York
S. hüpschii (Bargatzky)	Givetian	Devon, Eifel, Paffrath
S. bücheliensis (Barg.)	Givetian	Devon, Eifel, Paffrath
S. bücheliensis var *digitata* Nich.	Givetian	Devon, Eifel, Paffrath
Stromatoporella granulata Nich.	Hamilton	Ontario
S. damnionensis Nich.	Givetian	Devon, Eifel
Idiostroma oculatum Nich.	Givetian	Devon, Paffrath

Of these species seven are Middle Devonian, being well-known British, German (Givetian), or North American (Hamilton) forms, three come from the Helderbergian of North America (Lower-Lower Middle Devonian), and two occur in the Wenlock and Niagaran (Middle Silurian). *Clathrodictyon regulare* (von Rosen), one of these species, while being highly characteristic of the Wenlock, has also been recorded from the Devonian (Coblenzian-Eifelian) of the Ancenis Basin, France (Le Maitre, 1934), an occurrence which is interesting in view of the presence of this species in the Middle Devonian limestones of Buchan, Victoria. Another form occurring in the Chalonnes limestone of the Ancenis Basin, described as *Cl. striatellum* (Le Maitre, 1934), is very similar to *Cl. calamosum* Ripper of the Lilydale limestone.

It is obvious, therefore, that this fauna has little in common with the Wenlock stromatoporoid fauna of Great Britain or Gotland, and its affinities with the Devonian fauna are emphasized by the presence of species of *Actinostroma* belonging to the group of *A. clathratum* Nich., of species of *Clathrodictyon* belonging to the group of *Cl. striatellum* (d'Orb.), in which the skeletal structure is of an advanced type, and that of *Cl. chapmani* Ripper; of various transients between *Syringostroma* and *Stromatopora,* and of those types of *Stromatopora* most common in the Middle Devonian, in which the radial pillars dominate the skeletal mesh.

Summary and Conclusions.

The description of the stromatoporoid fauna of the limestone at Mitchell's Quarry, Cave Hill, Lilydale, is concluded in this paper, which deals with the species of *Syringostroma, Stromatopora, Stromatoporella,* and *Idiostroma.* Reviewing the whole fauna as far as it is at present known, it may be noted that a high proportion of the species can be identified with forms occurring elsewhere in the Middle Devonian; three occur in the Helderbergian (Lower and lower part of the Middle Devonian) of North America, while only two are typical of the Wenlock limestone of Great Britain and the Niagaran of North America. As will be shown later from evolutional considerations, the new forms described by the writer are usually of advanced types, and it is obvious that the Lilydale stromatoporoid fauna has very little in common with that of the British Wenlock, to which the Lilydale limestone has generally been considered to be equivalent, and should rather be correlated with European and North American Devonian faunas.

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Explanation of Plate VIII.

Fig. 1. *Syringostroma* aff. *ristigouchense* (Spencer). Mitchell's Quarry, Cave Hill, Lilydale. Vertical section. Coll. Dept. of Geology, Univ. of Melbourne, Reg. No. 1619. × 4 approx.

Fig. 2. Same form. Tangential section of the same specimen. × 4 approx.

Fig. 3. *Syringostroma densum* Nicholson. Mitchell's Quarry, Cave Hill, Lilydale. Vertical section. Coll. Dept. of Geology, Univ. of Melbourne, Reg. No. 1620. × 8.5 approx.

Fig. 4. Same species. Tangential section of the same specimen. × 8.5 approx.

Fig. 5. Same species. Tangential section of the same specimen, showing an astrorhizal system. × 4 approx.

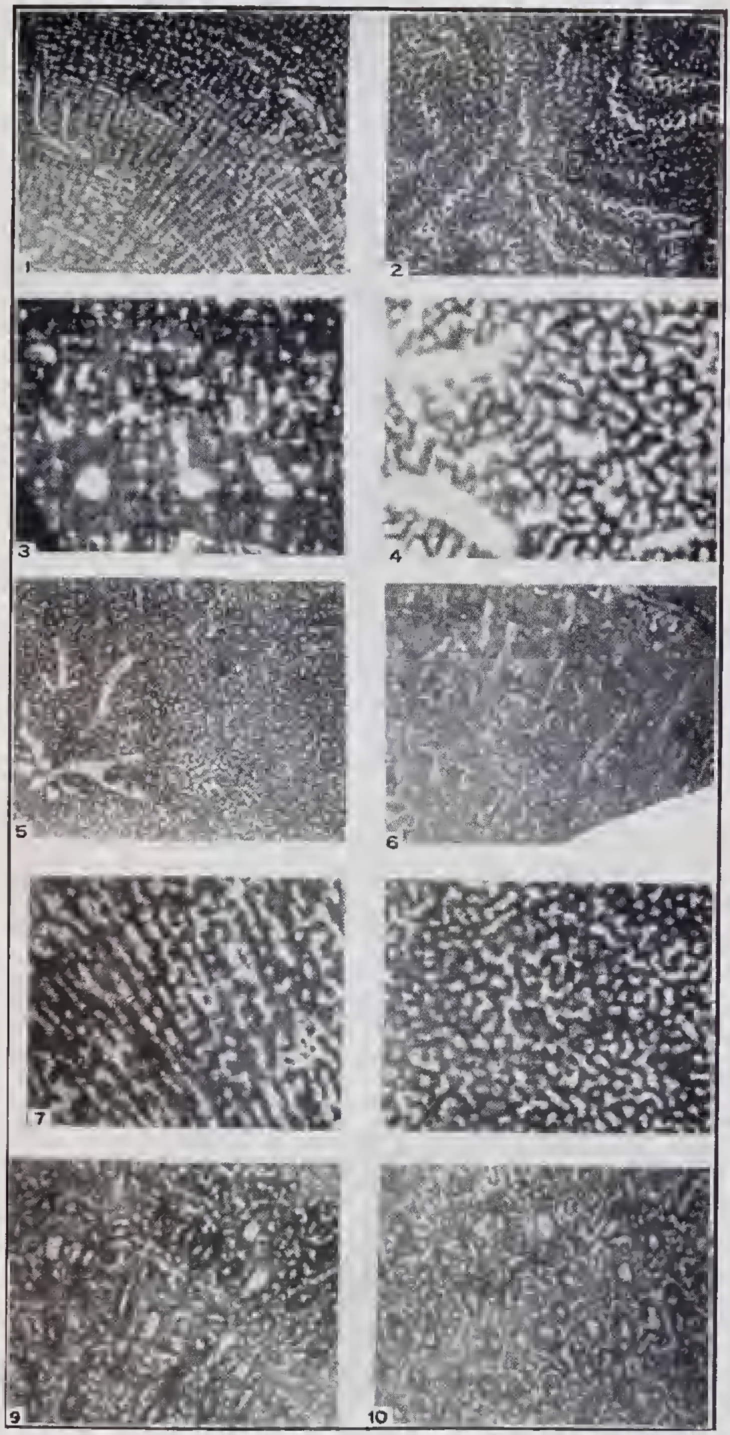
Fig. 6. *Stromatopora bücheliensis* (Bargatzky) var. *digitata* Nicholson. Mitchell's Quarry, Cave Hill, Lilydale. Vertical section. Coll. National Museum, Melbourne, Reg. No. 13794. × 4 approx.

Fig. 7. *Stromatopora* aff. *hüpschii* (Bargatzky). Mitchell's Quarry, Cave Hill, Lilydale. Vertical section. Coll. National Museum, Melbourne, Reg. No. 13790. × 4 approx.

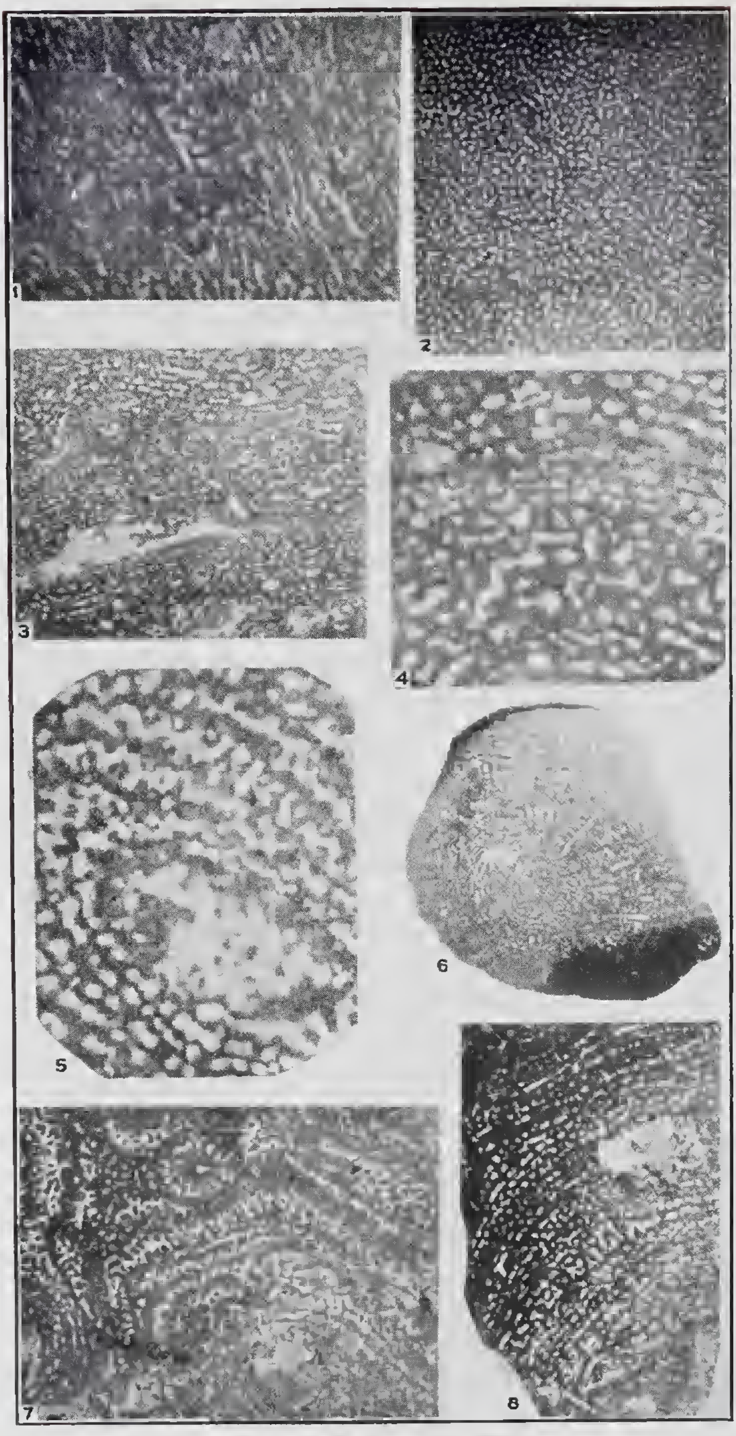
Fig. 8. Same form. Tangential section of the same specimen. × 4 approx.

Fig. 9. *Stromatopora bücheliensis* (Bargatzky). Mitchell's Quarry, Cave Hill, Lilydale. Vertical section. Coll. National Museum, Melbourne, Reg. No. 13763. × 4 approx.

Fig. 10. Same species. Tangential section of the same specimen. × 4 approx.



Lilydale Stromatoporoids.



Lilydale Stromatoporoids.

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Explanation of Plate IX.

Fig. 1. *Stromatopora lilydalensis,* sp. nov. Mitchell's Quarry, Cave Hill, Lilydale. Vertical section. Coll. National Museum, Melbourne, Reg. No. 13768. × 4 approx

Fig. 2. Same species. Tangential section of another specimen. Coll. National Museum, Melbourne, Reg. No. 13785. × 4 approx.

Fig. 3. *Stromatoporella granulata* Nicholson. Mitchell's Quarry, Cave Hill, Lilydale. Vertical section. Coll. Dept. of Geology, Univ. of Melbourne, Reg. No. 1622. × 4 approx.

Fig. 4. Same species. Vertical section of the same specimen. × 8.5 approx.

Fig. 5. Same species. Tangential section of the same specimen. × 8.5 approx.

Fig. 6. *Idiostroma oculatum* Nicholson. Mitchell's Quarry, Cave Hill, Lilydale. Transverse section. Coll. National Museum, Melbourne, Reg. No. 13779. × 2.

Fig. 7. *Stromatoporella* cf. *damnionensis* Nicholson. Mitchell's Quarry, Cave Hill, Lilydale. Tangential section. Coll. National Museum, Melbourne, Reg. No. 13788. × 4 approx.

Fig. 8. Same form. Vertical section of the same specimen. × 4 approx.